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Corporate and customer understanding of core values regarding perceived quality: Case studies on Volvo Car Group and Volvo Group Truck Technology

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Abstract

Core values are an important part of Volvo Car Group's and Volvo Group Truck Technology's strategic development plans. Both of these companies share the same three core values: Quality, Safety and Environmental Care, but they approach these values in different ways due to different customer demands. This study seeks to understand how industry professionals and customers perceive these core values and the attributes that are associated with them, using semi-structured interviews with industry professionals from both companies and quantitative survey methods with customers. The purposes of this study are to investigate how designers convey core values to customers through product attributes and how customers perceive those core values through the same attributes. Such an understanding can contribute to more effective design processes that communicate company values in the early product development phases.

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Keywords: Core values; perceived quality; product quality; information and knowledge management in product development

1. Introduction

Core values are considered to be an important part of any company. Volvo as a brand has a long history, tradition and three major core values - Safety, Quality and Environmental Care. These are the three pillars which form the foundation of the brand, highly influenced by the company's heritage. Since the automotive market nowadays is highly competitive these core values must be ingrained in the product in the best possible ways. Products delivered in the premium segment of the automotive industry are technically excellent and one of the significant factors influencing customer choice is perceived quality. It is important to understand how industry professionals and customers perceive product quality, as discrepancies among the two groups can lead to products that are not designed to effectively communicate the core values. This study shows the case of Volvo Car Group (VCG) and Volvo Group Truck Technology (GTT). Both of these companies share the same core values but approach them in different ways due to different customer demands. We investigate how they communicate the core values to the customers, through a number of in-depth qualitative interviews with senior and top management. Interviews were performed with key people from both companies who define development and the future look of Volvo vehicles. This helps

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us to understand on which perceived quality attributes the companies focus in order to communicate their core values. Current and future trends in the core values' reflection on perceived quality were also revealed.

To understand how these core values are actually perceived by the customers in practice, a quantitative survey was conducted online with a number of Volvo car owners as well as semi-trailer truck drivers. These respondents were given a task to rank the importances of the attributes that the professionals listed, which provides an understanding into some of the similarities and differences between the ways that designers and users perceive Volvo's shared core values. One of the methods used in the surveys is Maximum Difference Scaling (MaxDiff), which is a quantitative choice-based technique used for understanding a respondent's or a respondent group's relative valuation of different products or product attributes. MaxDiff is used along with questions using the more common semantic-differential scaling, which is one way to avoid lack of discrimination and confounding among respondents [1].

This paper begins with a discussion of the background theory behind the research methods. This is followed by a description of the methods used to interview the design professionals and a summary of findings, as well as the same for the customer surveys. It concludes with a discussion of the results and suggestions for future research.

2. Background

2.1 Communication model

How customers interpret core values is partly based on their interactions with the product. The company communicates with the customer through perceived quality attributes. According to Vihma's semiotics approach [3], the customer can see the final product as a number of signs to be interpreted. Krippendorff and Butter suggest that a designer can play the role of a communicator, creating a range of forms, and it is useful to view his or her relation with the customer as part of the communication process [4]. Shannon [5] developed a basic communication system containing such elements as the information source, transmitter, channel and destination. The information source communicates different types of messages to the destination. A transmitter produces a signal suitable for the channel and the encoded signal is then transferred over the channel. The receiver then inverses the signal and recreates the message designed for the destination.

Forslund [6], drawing on Shannon's communication model [5] and with additional input from Crilly et al. [2] and Krippendorff [7], summarizes a process of communication as customer awareness and perception of the message deriving from the designer. Thus, product features are transferred across the channel. These features are then decoded by the senses (vision, haptics, smell, and hearing) and subsequently perceived by the customer.

In this study the described communication model is implemented to the transmission and interpretation of core values through perceived quality. During qualitative interviews with senior and top management of VCG and GTT we recorded their vision and interpretation of the company's core values. We also investigate product attributes that, in their opinions, represent the core values. Crilly et al. drawing on O'Shaughnessy [8] and Bloch [9], describe a traditional view on customer perception of the product as a form of "cognition and affect followed by behaviour" [2]. This approach can represent a communication system regarding core values transfer, adapting the design communication process characterized by Crilly et al. [2], which states that "designers have intentions for how a product should appear, the product is manufactured, placed in an environment, perceived by the consumer and finally responded to" (see Fig. 1).

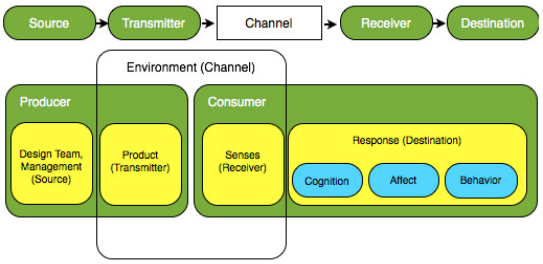


Fig. 1. Basic framework for design as the process of communication, adapted from Crilly et al. [2]

To summarize, we examine how core values are reflected through product quality attributes, seeing them as both the source and the transmitter, and then we look to the customer's perceived quality impression as a receiver and destination in this communication model.

2.2 Exploratory research methods

There are a number of qualitative research methodologies such as sampling, interviews, group interviews, and observations. Methodologies can be combined such as case study and action research. The interview is one of the most widely used methods in qualitative research [10]. Interview studies are typically classified as structured, unstructured or semi-structured. During the professionals' evaluation we used semi-structured interviews. The semi-structured interview normally includes elements from both structured and unstructured interviews. Cachia et al. describe semi-structured interviews as follows: "A fixed set of sequential questions is used as an interview guide but additional questions can be introduced to facilitate further exploration of issues brought up by the interviewee, thus almost taking the form of a managed conversation" [11].

For evaluating the consumer side of the communication model in Fig. 1, a quantitative survey technique is employed called maximum-difference scaling (MaxDiff). This method was originally developed by Louviere [12] to understand a respondent's or group of respondents' relative valuations of different products or product attributes. Its main purpose is to aggregate and estimate rank-order information when there are too many attributes for a normal rank-order survey task. Since rank ordering only yields ordinal information without any absolute level of importance [13], this is combined with a small number of semantic-differential tasks that ask for the perceived importance level of specific attributes, ranging from not at all important to the highest priority of importance. According to Marley and Louviere [14] best-worst tasks

positively affect the consistency of the responses and can be easily understood by respondents. Magidson et al. [1] states that use of the semantic differential could influence the result from several aspects, such as lack of discrimination. Some respondents could rate plurality of the attributes as important and be distracted by the scale, and some respondents would likely avoid absolute ratings and others prefer the extremes. Because of these limitations, the use of semantic differential was combined with MaxDiff.

The procedure of the study is a combination of in-depth, semi-structured interviews with professionals complimented with surveys performed on drivers (see Fig.2).

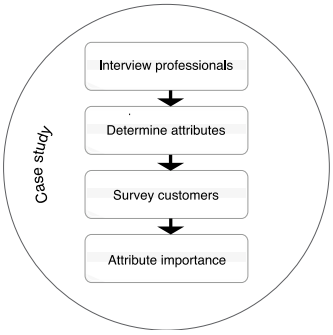


Fig. 2. Procedure scheme of the case study

3. Professionals study

We performed a qualitative study on automotive industry professionals from VCG and GTT in order to reveal a list of product attributes that represent core values. The list of the perceived quality attributes determined by professionals was used in the development of two surveys that were performed on car and truck drivers.

3.1. Method

In this study we interviewed six high-ranked professionals on the level of director and vice president. The main reason for this selection was to obtain a holistic view regarding core values and perceived quality from highly-skilled professionals with a long track record in the automotive industry. Both of the companies operate globally and it was a good opportunity to interview those individuals, since all of them had working experience in different markets in Sweden and abroad. Each of the interviews was completed in approximately 40 minutes. Interviews were voice recorded and later transcribed to text. Questionnaires were created in order to clearly reveal their vision of the core values, explain communication strategies and show how they understand and implement core values regarding perceived quality. Professionals from VCG and GTT were asked the same types of questions, since they share the same core values. In the beginning of the interviews, questions were quite open and general. For example:

- Could you describe your responsibilities at the company?
- What are the core values at the company?
- Why were those core values chosen?
- How do you communicate your core values to your customers?
- Do you think your customers perceive your core values through the product?

The subsequent questions narrowed interest to the relation of perceived quality attributes regarding each of the core values:

- I know that you have several product attributes that define your brand and products. Can you explain what an attribute is and how you work with attributes?
- What attributes are more important?
- What attributes are the most communicative for the customers?

During the interviews we sometimes asked additional questions in order to explore topics widely and determine perceived quality attributes clearly. For example: “Can you give any examples of how your core values are represented by product attributes?” or “Do you believe that your customers can interpret your core values through the products’ attributes?”

3.2. Results

The interviews provided us with valuable information regarding branding, communicative strategies, and ways of setting requirements to fulfill core value-related needs. The data shows commonalities and discrepancies between VCG and GTT. We were able to formulate lists of product attributes that correspond with each of the core values of both companies. Shown in the Tab.1 lists were used in the subsequent survey of car and truck drivers.

3.2.1 Volvo Car Group professionals

The interviews revealed that VCG currently has three major pillars that form requirements for current and future products: *created around people, contemporary luxury experience,* and *strength in every sense*. Since VCG already has strong passive safety features, proven over time and highly perceived so, they shifted towards innovative active safety systems such as City Safety, pedestrian detection and lane departure warning. Practical implementation when it comes to safety shows that VCG is developing systems that prevent car accidents, rather than systems that help during the accident. VCG created a new approach regarding safety by changing the dialog with customers from “it helps you” to “it makes you a better driver”. Professionals believe that safety features are highly perceived by the customers. When it comes to quality VCG sets a “luxury experience” as a description for exterior design as well as for interior, split lines, fit and finish, NVH (noise, vibration and harshness) and craftsmanship. The new trend regarding quality perception is use of premium brands support for example, the sound system in Volvo cars features brands such as Bowers and Wilkins and Harman/Kardon. A strong emphasis is given to HMI (human-machine interface) or infotainment systems in Volvo cars. The new Sensus Connected Touch integrated system received a

Table 1. List of attributes and affiliated companies and core values (core values: Q = quality, S = safety, E = environmental care).

		Cars			Trucks		
Abbr	**Attribute**	**Q**	**S**	**E**	**Q**	**S**	**E**
Abr	Active Braking					x	
Acc	Acceleration time	x			x		
ACr	Adaptive Cruise Control system					x	x
Aer	Aerodynamic exterior shape			x	x		x
Air	Air freshness	x			x		
BrN	Volvo brand name / Brand of truck	x	x	x	x	x	x
BSD	Blind spot detection system		x			x	
CO2	Carbon dioxide emissions			x			x
Com	Comfort	x			x		
CSF	Colors and surface finish	x			x		
CSS	City safety system (low speed crash avoidance)		x				
Dig	Digital speedometer	x	x				
DnM	Durability and maintainability	x	x	x	x	x	x
DrE	Drive-E (efficient engine technology)			x			
DST	Dynamic stability and traction control		x				
EIP	Energy absorbing instrument panel					x	
EnN	Engine noise				x		
ESP	Electronic Stability Program (ESP)					x	
ESW	Energy-absorbing steering wheel					x	
Exh	Exhaust						x
ExN	External noise						x
Fcn	Functionality				x		
FCW	Forward Collision Warning					x	
FDB	Feedback on driving behavior						x
FPD	Free from production defects	x					
FuC	Fuel consumption			x			x
GpE	Uniformity and size of gaps between exterior parts (such as doors and hood)	x			x		
GpI	Uniformity and size of gaps between interior parts (like on instrument panel)	x			x		
HAS	Home safe and approach lighting		x				
ICA	Inflatable curtain airbags		x				
IIS	Intuitiveness of infotainment system (e.g., navigation and stereo controls)	x					
InL	Interior lighting	x					
LCS	Lane Change Support					x	
LDB	Locally designed and built			x			
LDW	Lane departure warning system		x			x	
LFW	Low-friction wheels			x			
Log	Feature-specific logos (e.g., hybrid, methane diesel, stereo brand name)	x			x		x
Lwt	Light weight			x			x
MEx	Minimalistic exterior “look” (not too many lines or details)	x					
Mir	Mirrors					x	
NLI	Noises inside the car (e.g., squeaks, rattles)	x					
NLO	Noise level inside the car (e.g., from wind, engine)	x					
ORC	Off-road capability	x	x				
PBS	Presence of blind spots/visibility		x			x	
PNM	Presence of natural materials (like real wood and leather)	x					
PPS	Pedestrian protection system		x				
PRM	Presence of real materials (e.g., chrome, Al.)				x		
Rec	Recyclability			x			
Rel	Reliability	x	x		x	x	x
Res	Resale or recyclability						x
Rmy	Roominess	x					
SDL	Sound of door latch				x		
SEA	Stylish external appearance	x			x		
Ser	Customer care & service quality				x		
SIP	Side impact protection system		x				
SRM	Scratch resistance of materials	x					
Sze	Size of car		x				
ToC	Tightness of controls (e.g., steering wheel, gear shifter, pedals)	x			x		
TPM	Tire Pressure Monitoring					x	
TSB	Three-point safety belt with electronic lock					x	
Wgt	Weight of car		x				
WRW	Water repellent windshield		x				

Red Dot Design Award in 2013. VCG sees further development of simple and sophisticated HMI systems as another opportunity to differentiate their products on the market. Environmental care is represented by the DriveE powertrain family, which is known for low emissions. The above mentioned all demonstrate that VCG professionals are avoiding “technocratic” ways of product presentation with many technical details. Instead there is a change to “clusters” – packages that are understandable to the customers without technical backgrounds. It leads to the creation of sub-brands around VCG and in some cases collaboration with third party brands highly perceived by their properties.

3.2.1 Volvo Group Truck Technology professionals

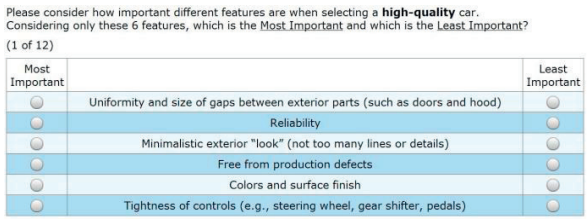
GTT communicates to the customers five major attributes: uptime, innovation, care, fuel efficiency and driver environment. They have a different approach since customer demands are very specific and the relationship is most often business-to-business. Quality in trucks on a physical level is represented by durability and reliability. It is found from the interviews that the term “quality impression” is that which is perceived by the customer in terms of quality. Quality impression contains robustness, where the most important part is absence of free play in the parts of the truck: gaps and flush with importance of constant gaps between parts, surface fit and finish represented by homogeneity among the parts and colors, and functionality and comfort impression which includes proper sound feedback that suits the operation. It is important to add that other significant aspects that differentiate quality perception for trucks are uptime and aftersales service. Professionals also say that one of today’s biggest challenges for truck companies is to offer premium service. Environmental care is also one of the core values that is really not easy to represent in a truck. GTT created an environmental communication platform that gives base and direction in terms of marketing. The focus areas of this platform are emissions, energy and climate. Volvo trucks’ range also includes a methane-diesel truck featuring lower emissions and fuel consumption in comparison to normal trucks. It is believed that such a truck is perceived by the customers as environmentally friendly, and by owning such a truck customers put an effort into society and environmental care. Qualitative interviews with Swedish Volvo trucks fleet owners confirmed this. Fleet owners want to show to their customers that they use environmentally friendly vehicles. Unfortunately at the moment, the only way to communicate that visually is a slightly different design of the cabin and colors that represent environmental care. Environmental care is still not highly perceived but there is high demand from the customer side, at least in Sweden. There is a demand for hybrid trucks operating in the city as well. The study revealed that professionals are aware of these issues and are continuously looking for improvements in these areas. Interviews show that GTT has a trend to cluster their technical packages in the same way as VCG. In terms of quality, the shift was into developing customer services and customer relations.

4. Driver study

Based on the list of product attributes collected from the interviews with industry professionals shown in Tab. 1, two surveys were developed to understand how drivers of cars and

trucks perceive these core values and attributes. The surveys were administered online to a Swedish sample group recruited from a panel through a market research firm, and responses were collected from 67 Volvo car drivers and 18 current or former truck drivers, 14 of whom had most recently driven a Volvo truck. After asking several qualification questions to ensure that respondents were comfortable with an English survey, lived in Sweden, and drove a Volvo car or a semi-trailer truck (of any brand), both surveys began by asking free-response questions about what descriptive words come to mind when they think about their car/truck and each of the core values (quality, safety, and environmental care).

This was followed by three semantic-differential questions in each core value category to understand whether certain attributes were deemed important; this is needed to anchor the ordinal rankings that would be found next in the maximum-difference scaling (MaxDiff) section, which can explain whether one attribute is more important than another, but not whether the attribute is minimally or highly important. Finally, three separate MaxDiff exercises were given for the attributes related to each of the core values, which resulted in a rank ordering of the attributes. An example MaxDiff question is shown in Fig. 3.


Please consider how important different features are when selecting a **high-quality** car.
Considering only these 6 features, which is the Most Important and which is the Least Important?
(1 of 12)

Most Important		Least Important
○	Uniformity and size of gaps between exterior parts (such as doors and hood)	○
○	Reliability	○
○	Minimalistic exterior "look" (not too many lines or details)	○
○	Free from production defects	○
○	Colors and surface finish	○
○	Tightness of controls (e.g., steering wheel, gear shifter, pedals)	○

Fig. 3. Example MaxDiff question for Volvo car drivers regarding quality.

4.1. Volvo car owners

The 67 Volvo car owners were first presented with a list of nine descriptive words, including the three core values, and asked whether they associated those words with their cars. The responses showed that 50 thought of their Volvos as "high-quality", 61 as "safe", and 20 as "environmentally-friendly". This shows that the first two core values are being communicated to the customers significantly more effectively than the last one.

Next, the survey focused on each of the core values sequentially, first asking for an importance rating for three attributes in each category, and then performing a MaxDiff ranking exercise comprised of 6-12 questions each. The importance ratings were evaluated on a semantic-differential scale, where an evaluation of 1 is "not important at all" and a score of 5 is the "highest priority". The average results from these questions are shown as insets in Figs. 4, 5 and 6. Since all of these averages were above the middle option (3), we can believe that the rankings in the MaxDiff exercise should reflect attributes that are indeed important for evaluating products with respect to the core values.

The results from the MaxDiff questions presented to car owners are summarized in Figs. 4, 5 and 6, showing the top ten most important attributes to customers in each category.

4.2. Volvo truck owners

A similar survey was administered to a group of truck drivers, using different lists of attributes that were deemed important to truck design based on the interviews with professionals at Volvo Trucks. They were first asked the same association questions as the car owners, and of the 14 Volvo truck drivers, 10 thought of their truck as "high quality", 9 as "safe", and 5 as "environmentally-friendly". This is similar to the proportions stated by the Volvo car drivers.

The semantic differential scale importance ratings for the truck drivers are also shown as insets in Figs. 4, 5 and 6, which can be used to anchor the ordinal information from the following MaxDiff exercise to a more absolute level of importance.

In contrast to the car drivers' importance ratings, where the three core values seemed to be valued as approximately equally important, Fig. 6 shows how truck drivers value environmental care-related attributes much lower than quality and safety attributes. In fact, fuel consumption is rated close to "not at all important" for truck drivers, whereas car drivers placed the same attribute closer to a "highest priority".

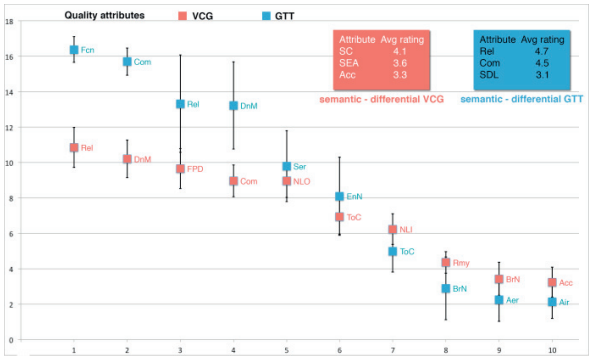


Fig. 4. Importance of the quality attributes for Volvo car and trucks drivers (see Tab. 1 for abbreviation key).

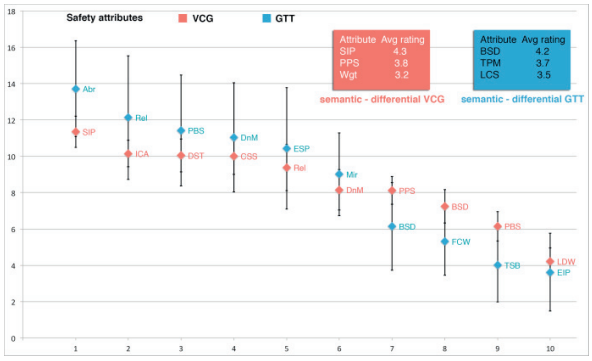


Fig. 5. Importance of the safety attributes for Volvo car and trucks drivers (see Tab. 1 for abbreviation key).

One counterintuitive result from this study is that while fuel consumption receives a lower rating than lightweight materials and exhaust on the semantic-differential scale, fuel consumption is ranked higher than the other two in the

MaxDiff ranking. This is most likely a result of how the respondents interpreted the two forms of questions, as well as perhaps the low reliability of the MaxDiff method with small sample sizes.

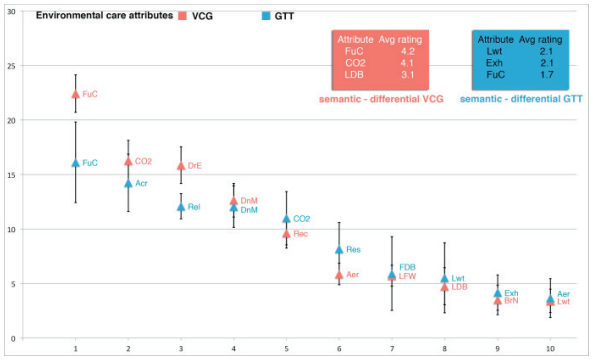


Fig. 6. Importance of the environmental care attributes for Volvo car and trucks drivers (see Tab.1 for abbreviation key).

5. Discussion

The semi-structured interviews with professionals revealed several interesting trends. Both companies are perceived as premium brands. This leads to the clear understanding that in this segment of the market quality has increased so much that it is no longer a differentiator. In relation to the core values, safety is a highly perceived Volvo brand heritage. Professionals also believe that safety is highly perceived by the customers, and the quantitative survey confirms that. The goal of both companies is to be leaders in this area. Today, Volvo is achieving that through the implementation of active safety packages in cars and trucks. The companies have differences regarding their definitions of quality and environmental care.

The quantitative survey of drivers confirmed some of the trends pointed out by professionals while also providing important insights into how consumers value different attributes and assess vehicle quality, safety, and environmental care. For both driver segments, reliability and durability/maintainability were in the top six of every category they appeared in, showing the importance of these characteristics for all of the core values. In contrast, the vehicle brand was not ever rated in the top seven, though it appeared in every list. This is an interesting finding since reliability, durability, and maintainability are generally not easily perceivable prior to purchasing a new vehicle, and perhaps the best way to estimate these attributes is by the vehicle brand reputation and history. This demonstrates one of the challenges in quantitative survey design, as it is often difficult for survey respondents to identify the importance of an attribute like brand in such a context.

Some of the key differences between the perceptions of professionals and drivers include uniformity among the parts, gap and flush, and surface finish regarding VCG. This probably relates to the high quality among all players in premium segment of the market. As a result, the customer perceives quality as a given feature. In a similar way, GTT perceives very low customer interest to the exterior lines, gaps, sounds and lightweight materials used in the truck.

6. Conclusions and future work

To conclude this discussion, the core values of VCG and GTT have not changed over time, but the characteristics that reflect those core values are dynamically changing. This study has revealed current trends regarding professionals' visions regarding core values, and it has demonstrated how customers also perceive those values. This understanding can help reduce the gap between the perceptions of professionals and customers, which can lead to improved product development in these markets.

Acknowledgements

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